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ABSTRACT

To investigate the hypothesis that cognitive rules govern writing behavior, Carter's signaled stopping technique was used to study language and cognitive effects in public relations messages. Principles from Grunig, et al (1985) Axiomatic Theory of Cognition and Writing, which proposed premises, axioms and definitions about writing, were applied to one group of 30 college students and another group of 29 students to test for important differences in signaled stops for two versions of a story about alcohol abuse. Control groups read a story without figures of speech, and experimental groups read a story worded exactly the same, but with analogies and examples. Stops for the following reasons were coded: (1) confusion about the text, (2) need to reread, (3) need to ask a question, (4) reflection about the text, (5) sudden insight or understanding, (6) to agree, and (7) to disagree. Results revealed that signaled stops for thinking and for understanding were significantly greater for the experimental groups, whose text contained figures of speech. The figures of speech caused few confusion stops, however, and there was no clear pattern for questioning stops. The findings suggested that, while the signaled stopping technique requires refining, it is a useful new way for testing messages for understanding and meaning. (SKC)

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Signaled Stopping And Cognitive, Language Principles Applied To Public Relations Writing

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Signaled Stopping And Cognitive, Language Principles Applied To Public Relations Writing

ABSTRACT

Carter's signaled stopping technique is used to study language and cognitive effects in Public Relations messages. Principles from Grunig, etal (1985), An Axiomatic Theory of Cognition and Writing, were applied to two different student populations to test for important differences in signaled stops for two versions of a story about alcohol abuse. Control groups read a story without figures of speech, and experimental groups read a story with analogies and examples. Signaled stops for thinking and for understanding were significantly greater for experimental groups. Explanations from cognitive psychology are presented.

Signaled Stopping And Cognitive, Language Principles Applied To Public Relations Writing

Pre-testing of public relations message elements and basic research on public relations writing have proceeded at a snail's pace because of an understandable reluctance to assume anything that goes on inside the human mind preceding, during, or following communicative acts. The "intrinsic connection" between social and cultural systems and human thought and behavior, especially as far as Public Relations is concerned, is in the public relations mesage, however delivered. Until quite recently we had primarily Festinger's cognitive dissonance theory and certain traditional persuasion theories at the mental level, and readability studies at the message level to guide research on writing. Thanks to advances in cognitive sciences, however, we now seem to be on the threshold of a new era in writing research. Many researchers in speech, social psychology, anthropology, and, hopefully, our field as well, are using cognitive concepts to help unravel some of the mysteries of the effects of message elements in writing, speaking, or

otherwise communicating at the important level of words or other symbols and mental behavior.

The idea that rules governing writing style and organization may, indeed, be studied empirically and subjected to theoretical inquiry might repel some journalists, because scientific answers might remove some of the ancient mystique attaching to the writing ritual. There may even be those attending this meeting who, while believing good writing can be taught, also believe it is less than reasonable to assume a theoretical base for writing rules.

In the early 1980s, James Grunig and a group of doctoral students at the University of Maryland diligently attacked the problem of pulling together a thesis on language, cognition and writing that would reflect recent findings in cognitive psychology, social psychology, philosophy of language, information theory, reading theory, rhetorical and systems theory. The outcome of this endeavor was an article titled an Axiomatic Theory Of Cognition And Writing (1985), authored by Grunig and two of his doctoral students. The authors' theory of writing contained fifteen definitions, eleven premises, and eleven axiomatic principles. The intention was to offer a broad framework for future research in language, cognition and

writing. To provide a background for the principles introduced in the article, a brief, simplified overview of some of the concepts utilized in cognitive research bear repeating.

Memory And Cognition

Memory--cognitive psychologists conceptualize memory as having three components: sensory or iconic memory that preserves visual and auditory images for seconds; short-term memory that permits the holding of information in an active state in the mind but with limited capacity--seven (plus or minus two) bits of information; and long-term memory that has infinite holding capacity but limited access through short-term memory. Because short-term memory is limited, information must be chunked or structured or it cannot become part of long-term storage and will be lost. The necessity of chunking or elaborating within short-term memory, in order to store information, explains why cognitive structures rather than words or sentences get stored.

Cognitive structures--cognitive scientists generally conceptualize cognitive structures as consisting of 1) agents such as subjects or objects, attributes, or characteristics, and 2) relational rules that bind agents, attributes and recipients together, such as spatial, time,

or logical connections. Cognitive structures vary in complexity within and among individuals.

Schemata--much of the information stored in long-term memory appears to be stored as large, hierarchical units of knowledge that organize much of what people know about general categories of objects, classes of events, and types of people. These are generally referred to as schemata; they are broader than cognitive structures; in fact, they are comprised of sets of cognitive structures. People retain information from reading or attending by encoding from short-term memory as a cognitive structure; in long-term memory, however, sets of these structures are organized into comprehensive schemata.

Image--images are sensory analogs of what people "see" around them. Images capture spatial relationships, while language, in contrast, is organized sequentially.

These concepts are historically bound up with journalism, mass communications and writing through Information Theory. Information Theory, as conceived by Shannon in 1948, addresses the randomness of elements in a message, or the "information content." Entropy is greatest when the next word or syllable could be any word or syllable and therefore cannot be predicted. Redundancy, on the other hand, makes it possible to

predict the rest of a message after hearing part of it. Redundancy makes language recognition possible. This is why information theory, so much a part of communications research, also has fueled the growth in developmental or cognitive research in psychology and anthropology.

We can understand, then, why completely parsimonious messages may not always produce greater understanding--because all of the information is new, not redundant. On the other hand, introduction of definitions, analogies, examples, metaphors and parables introduces redundancy into the message by elaborating the topic in a way that is familiar to readers. At this point, then, brief explanations of the principles outlined in the axiomatic theory seem appropriate.

Parsimony And Redundancy

The Parsimony Principle--The fewer symbols used to communicate ideas or cognitive structures of the same complexity, the more efficiently the person receiving the symbols will be able to reconstruct the concept or cognition. Examples of writing practices generally frowned upon that violate the parsimony principle would be overuse of the passive voice, complex and run-on sentences, all of which waste words and create wordiness; and complex sentences where dependent clauses often

disguise the relation between subject and object in the sentence. A piece of writing might be parsimonious, however, and still not be clear or understandable. When writers stack modifiers they are reducing redundancy in the sentence and violating yet another principle.

The Redundancy Principle--The use of different symbols within the same symbol system or the use of different symbol systems to communicate an idea or cognitive structure increase accuracy and understanding, especially where the message is complex. However, redundancy beyond the level indicated by the inherent complexity of the message will produce disinterest in the reader, and reduce accuracy and understanding, due to violation of the parsimony principle. Rhetorical devices such as definition, analogy, metaphor, example, or parable, and explanatory devices such as graphs, illustrations, formulas or descriptive statistics often increase the frequency of accuracy and understanding because they are redundant to familiar patterns, called schemata, in thinking.

Singularity And Complexity

The Singularity Principle states that people find it easier to construct or reconstruct one cognitive structure at a time than two or more cognitive structures. The

greater the number of cognitions communicated at one time, the less often accuracy and understanding will occur. This principle helps explain why writing principles and devices such as a unifying pattern beginning with a topic sentence and working forward with transitional phrases seem to work best in achieving understanding. Thus, when more than one cognition must be communicated at a time, the cognitions should be separated and linked by transitional devices. Also, people use schemata or referent criteria as frames to achieve singularity of cognitions. Such frames or schemata may hinder as well as help achievement of accuracy or understanding from a message.

The Complexity Principle explains that the greater the complexity of a cognitive structure or of the schema to which the structure is connected, the greater the difficulty of communicating the cognition to someone without an appropriate schema. Here, a communicator must try to understand a complex cognition before attempting to explain or communicate to others; also, to communicate a complex cognition to those without an appropriate schema calls for putting the cognition in a symbol system appropriate to the reader's/listener's schema. Thus, the research role of knowing one's audience and members'

cognitive complexities is amplified.

Low Involvement, Attitude, Other Principles

The Low Involvement Principle, following Grunig's situational theory, states that the lower a person's level of involvement in an issue, the greater the effects of the principles of singularity, parsimony, clarity, redundancy, and complexity in achieving accuracy and understanding. The Reconstruction Principle addresses the importance of rewriting or even, at times, reconceptualizing; to the extent to which communication is depended upon to help construct cognitions, the principle states, the more the message must be reconstructed utilizing the above principles. The Feedback Principle calls for research and pretesting of messages, in that it states that messages produced after receiving feedback from a previous communicative effort will result in greater accuracy and understanding than the first message.

The Attitude Frame Principle allows for the presence of a cross-situational attitude, or a referent criterion, to provide a frame for thought; this makes it difficult to achieve accuracy and understanding of cognitive structures whose implications for behavior do not fit within the attitude frame. Attitudes that frame thought stimulate counterarguing that makes more difficult the construction

of cognitive structures with behavior implications outside the frame.

The Persuasion Principle states that a person who holds a preponderance of favorable OR unfavorable cognitions (wedges) will be likely to form an attitude and engage in behavior, while a person who holds a relatively equal number of favorable and unfavorable cognitions (hedges) will not be likely to form an attitude and engage in behavior. Thus the greater number of cognitive structures with implications for attitudes and behavior favored by the persuasive communicator, the greater the likelihood of favorable attitudes and behavior. This implicates the final principle, the Synecdochic Principle, which states that symbols that suggest a familiar schema to the recipient of a message evoke complex meaning that is not apparent from the phrase alone to someone who does not have a similar schema. Thus when terms such as "girls" are used in messages referring to "women," such synecdochic phrases will also decrease accuracy and understanding.

Signaled Stopping In Writing Research

The Grunig, etal (1985) article concluded with results of several exploratory studies utilizing the signaled stopping technique as a tool to assist in

observing responses that might illustrate the axiomatic principles. Carter's (1973) signaled stopping technique is a useful tool for studying language and cognition. Experimental subjects read a message and place a slash mark in the copy at each point in the passage where they stop reading for some reason. Generally, people will stop when they find it difficult to process the words: they may have difficulty with the level of the language, with the ideas contained therein, or with the style of presentation. A coding scheme is used to allow generalization of study findings. During our studies, we used the following coding scheme or reasons for stopping:

C = Because of confusion.....The person stops or pauses because he or she feels they have lost the idea the writer is striving to communicate.

R = To reread.....The person stops and goes back over previous parts of the message either to get back on track or to enhance understanding of the material.

Q = To ask a question.....The person stops because a question forms in the mind, a question the reader wishes he or she could ask the writer for clarification.

T = To think about the idea.....The reader stops to "mull" over what has been read and to try to put it all

together; another term in some study areas for this stop might be "rehearsal."

U = Because of sudden insight or understanding.....The person stops because he or she does understand the "main idea" the writer has been trying to convey and wishes to "let it sink in."

A = To agree.....The reader agrees with the idea in the message.

D = To disagree.....The reader disagrees with the idea in the message.

Also, in some cases, readers are asked to write in other reasons for their stopping behavior.

Replication Studies Methodology

In followup studies from the theoretical paper, I used five of the above stops--C, R, Q, T, and U--to check for differences in stopping in a health message: two versions of a message on alcohol use and abuse were utilized, a "control" message that half of subjects read that was devoid of examples or analogies, and an "experimental" message that the other half of the subjects read that was worded exactly like the control message with the exception of added figures of speech.

Two sets of materials were distributed randomly within the study populations; the story with examples and

analogies was read by every other student in the class, and the story expunged of examples and analogies read by every other student. Student subjects were unaware of any differences in the stories read. They had been instructed to ignore any differences in individual completion time for the stopping exercises because some readers would naturally take longer to complete the stopping exercise than others due to the nature of the material.

The five signaled stops used in the studies were explained to students, with examples of how to use them in the stories (also, a sheet of explanation accompanied the stories). Students were advised that the study was entirely separate from their regular class activities, that their responses would in no way reflect on their class grade, and, also, that their cooperation was completely voluntary. They were advised, also, that if they chose to cooperate, their responses would be completely anonymous.

In the first replication study, 30 students participated, 15 completing signaled stops on a story with examples and analogies, and 15 a story without examples and analogies. In the second replication study, 29 student subjects completed stories, but one was eliminated for nonparticipation because it was obvious the student

either did not care or did not understand: the student had scrawled a "u" at the bottom of the entire story. Thus for this replication 14 stories with examples and analogies were used and 14 without figures were used. Without direct assignation, the same number of experimental and control subjects was analyzed for each of the studies. Obviously, matching student subjects for this type of study would be much more exacting than was undertaken here, and, hopefully, a more exacting protocol can be planned for this work in the future. It should be kept in mind, however, that these studies were meant to be further exploratory studies and not planned as carefully controlled, predictive experiments. Perhaps the findings from these minuscule studies will point the way toward enlarged, more carefully controlled projects.

Findings

What I had found in the original study (Grunig, etal, 1985) was that subjects who read the version of the story with examples stopped more often and stopped more often for every reason than to ask a question. Basically, then, using the same test materials, I repeated the study on student subjects in two different situations and settings. I will now describe these studies and discuss the findings. While it is customary to place tables at the

end of articles, I included tables within the text at this stage because I believed they were simple and this would increase text-to-table interaction and facilitate discussion.

Table 1 displays the results of repeating the signaled stopping technique on a population of students similar to the subjects in the first studies (reported in the axiomatic paper), except that students in the first studies were freshmen beginning writing students and the students depicted in Table 1 were primarily junior Public Relations students. Both student populations described thus far, however, were from a large Eastern university campus set within a metropolitan area, while subjects represented by data from Table 2 were from a mid-size State univerity in a rural setting in the Midwest.

Table 1. Number of Stops and Reasons for Stopping While Reading a Health Story About Alcohol Abuse, With and Without Examples (Public Relations class, Eastern university campus)

	Examples		No Examples		
Reason for Stopping	Mean	Standard Deviation	Mean	Standard Deviation	t
Think	1.80	2.04	0.80	1.01	*1.70

Understand	5.13	7.68	2.20	4.41	1.28
Reread	1.73	1.79	1.13	1.45	1.01
Confused	0.20	0.56	0.40	0.82	0.77
Questioned	0.40	0.91	0.53	0.74	0.44
Total Stops	9.26	7.72	5.06	5.50	*1.71
N		15		15	

*p .05

Table 2. Number of Stops and Reasons for Stopping While Reading Same Set Of Health Stories On Alcohol Abuse, With and Without Examples (Public Relations class Midwest campus)

	Examples		No Examples		
Reason for Stopping	Mean	Standard Deviation	Mean	Standard Deviation	t
Think	2.07	1.68	1.85	1.23	0.38
Understand	4.64	4.27	1.92	2.12	*2.13
Reread	1.85	1.65	1.85	1.56	0.00
Confused	0.50	0.85	0.21	0.57	1.04
Questioned	1.00	1.59	0.28	0.61	1.63
Total Stops	10.07	5.09	6.14	2.85	*2.52
N		14		14	

*p .05

Generally, these data support the findings from the original stopping studies, that is, that students reading stories with examples, and analogies in them demonstrated increased stops. Although increases were not always statistically significant, I think they demonstrate the interplay between parsimony and redundancy.

As Tables 1 and 2 show, the control version of the alcohol story preserved parsimony and students had to stop less often in reading the story; however, while there was increased redundancy in the experimental story, causing increased stopping, there was also a significant increase in understanding.

In an earlier, unreported replication of the original Grunig, etal (1985) study, all stops except those for "confused" and for "understanding" had been combined statistically for both control and experimental groups, and a significant difference ($F=3.97$; p .05) found between stops for confusion and those for "think, question, and reread." We also found a significant difference ($F=3.88$; p .05) between the two groups for "understanding" stops. One of my objectives for any further signalled stopping replications was to identify, if I could, stopping patterns. Thus, from the latter (Midwest group) stopping

study, I utilized the study population that had read stories with examples and analogies to compare stops for various story elements. Tables 3 and 4 show these findings.

Table 3. Stops for Six Story Examples In One Experimental Group

Stops:	Think	Understnd	Reread	Confused	Quest	F
Mean:	1.57	2.85	1.28	0.85	0.28	2.61
SD:	1.71	2.34	1.25	1.46	0.48	

N=15

Table 4. Stops for Two Story Analogies In One Experimental Group

Stops:	Think	Understnd	Reread	Confused	Quest	F
Mean:	1.00	4.00	3.00	0.00	0.50	2.81
SD:	0.00	1.41	2.82	0.00	0.70	

N=15

Although numbers were too low to be significant, it is easy to see from comparing stops that confusion was absent from analogies and low for examples; that questioning was low for analogies and quite low for examples; that understanding and rereading were high for

analogies; and that thinking and understanding were high for examples (rereading moderate for examples). Stops for thinking or for registering insight perhaps need little explanation, but stops for rereading are more difficult to explain.

Nelson (1973) viewed rereading among her young subjects as a positive developmental process for abstracting conceptual meaning; other researchers have viewed purposeful rereading as an important step in rehearsal and preparation for writing or for the learning of new material. A cognitive explanation of the process of rereading as a strategy might be that purposeful passing of new information across sensory thresholds permits greater elaboration within short-term memory, increases redundancy, and thus permits increased storage in long-term memory, defined as understanding by subjects.

Stops for confusion in figures of speech occurred only in the two examples that contrasted positive versus negative aspects of alcohol use (i.e. examples of social, responsible drinking versus examples of irresponsible, abusive drinking). This requires further research, but it is possible that pro-con constructs create processing difficulties under certain circumstances, depending upon the cognitive complexities of readers. It is obvious that

some examples were better than others for achieving thinking and understanding, but that one analogy produced the most understanding (following rereading, however).

For the next four tables, all stops from both groups--those who read stories WITH figures of speech AND those who read stories WITHOUT figures, from the Midwest sample, were pooled to look at language elements that occurred in both stories: i.e., a chemical formula for alcohol; depiction of the rate of alchohol absorption in the body (one-half ounce per hour with anything in excess of that causing bodily changes), followed by a list of the five stages of inebriation; and definitions of responsible versus irresponsible drinking.

Table 5. Total Stops, Both Experimental And Control Groups In One Study, For Chemical Formula For Alcohol

Stops:	Think	Understnd	Reread	Confused	Quest	F
Mean:	0.25	0.25	0.07	0.00	0.03	**4.09
SD:	0.44	0.44	0.26	0.00	0.19	

N=30

**p .05

Table 6. Total Stops, Both Experimental And

Control Groups In One Study

For Adsorption Rate For Alcohol

Stops:	Think	Understnd	Reread	Confused	Quest	F
Mean:	0.14	0.10	0.10	0.00	0.00	1.92
SD:	0.35	0.31	0.31	0.00	0.00	

N=30

Table 7. Total Stops, Both Experimental And Control Groups In One Study, For Stages Of Inebriation

Stops:	Think	Understnd	Reread	Confused	Quest	F
Mean:	0.25	0.28	0.10	0.00	0.03	**4.19
SD:	0.44	0.46	0.31	0.00	0.18	

N=30

**p .05

Table 8. Total Stops, Both Experimental And Control Goups In One Study, At Definitions For Responsible, Irresponsible Drinking

Stops:	Think	Understnd	Reread	Confused	Quest	F
Mean:	0.17	0.11	0.25	0.32	0.07	0.43
SD:	0.39	0.31	0.44	1.70	0.26	

N=30

In Table 5, above, for stops at the chemical formula for alcohol, there were no stops for confusion and only 1 to 2 stops for rereading and questioning, thus producing a significant difference between these stops and the ones for thinking and understanding. A chemical formula is familiar to most readers these days, but a chemical formula applied as if from a laboratory to a commonly consumed beverage produces stopping to think and restructure schemata about alcohol. While this particular concept is not complex, it does call for putting the idea into a symbol system appropriate to the audience, one that would be novel enough to produce thinking, yet redundant enough to produce understanding.

Tables 6 and 7 illustrate the importance of sequencing in story elements: that is, depiction of the rate of absorption for alcohol in the body is followed directly by the listing of the stages of inebriation. Thus, while stops for rate of absorption are not significantly different, stops for the outcome of ignoring the absorption rate are significantly positive for thinking and understanding.

The last table, Table 8, illustrates stops for definitions of responsible versus irresponsible drinking.

Although not statistically significant, stops for confusion are highest at these elements. Most likely the contrasting of two cognitive structures at the same time created problems for some readers. A better transition between the two definitions might have helped, but this was not tested. Seemingly, the contrast as presented did violate the singularity principle for a number of readers. (Perhaps this helps explain the confusion found in the examples containing contrast, also.)

I was unable to identify in these studies as clear a pattern for "questioning" stops as for the others. However, Nelson (1973) found questioning in young children a positive strategy for getting at conceptual meanings. Also, Nelson viewed the use of repetitions (repeating phrases after someone as an aid to listening) as being positive at a certain stage of childhood development. Later on, however, as children mature conceptually, the continued general use of repetitions is considered an immature strategy.

In the alcohol stories, most rereading stops were followed by stops for thinking or understanding; however, there were a few times where stops for rereading were followed by stops for confusion. It would seem as if the strategy of rereading to get at meaning must be viewed in

contexts both of symbols in the message and of individual differences in cognitive complexity. In other words, rereading adds redundant elements in most cases and aids in comprehension and understanding; in some instances, however, readers cannot find a match between story elements and schemata and rereading merely leads to confusion. Which leads to yet another cognitive and writing principle: The Clarity Principle states that communication will achieve accuracy and understanding more often when recipients of a message receive symbols that correspond to each element of a cognitive structure or network of structures, and the organizational pattern of the messages follows a rule that is apparent to the recipient.

We should not overlook the fact, however, that a story about alcohol use involves beliefs and attitudes. It would have been good had I included stops for "agree" and "disagree" in my studies from the beginning; but as I did not, I did not include them in the replications. I can only assume that subjects in my studies probably varied in their levels of involvement in the issue and their attitudes toward it.

In summary, the stories used for the stopping exercises in this study were simply constructed stories,

pared down to try to make testing of stops easier. Obviously, messages constructed by communicators during their routine acts of informing or attempting to persuade audience members are messages generally much more complex than the stories used here. Thus it is easy to see the difficulty attached to attempting to test the cognitive and writing principles and parse out references to principles through basic cognitive and writing research. It does seem worth the effort, however, as the cognitive sciences appear to have offered communicators a long-awaited window of opportunity to increased understanding of semantics and meaning in messages. In my work, in three out of four studies reported here, subjects' stops for "understanding" or for "thinking" were significantly greater in the story version with figures of speech added. As discussed, there also were other important differences. Explanations for these differences were offered here, but they require further testing.

While the signaled stopping technique may require future refining, according to cognitive concepts, the SST appears to be one of the better ways of pretesting messages for meaning than we have had for awhile. Perhaps we should consider using signalled stopping more often in message testing procedures and for writing research.

Selected References (necessarily pared to reduce copying costs), in Alphabetical Order

(More complete lists of references may be obtained by referring to the articles listed below.)

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